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A Case Study of the Integration of 21st Century Technology within the Place-Based, Expeditionary Learning Outward Bound (ELOB) Approach to Education

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The digital culture surrounding today's learners and educators affords opportunities to redefine and potentially enhance the teaching and learning environments to encompass a global-based educational experience. Utilizing tools such as the Internet, iPads, Skype, podcasts, and mobile devices, educators may access and possess technology with the power to engage, enhance, encourage, and motivate the 21st Century learner. Further, parallel to the new technologies and 21st Century learning, the International Society for Technology in Education (ISTE) focuses on six concepts that frame the identified 21st Century skills: Creativity and Innovation, Communication and Collaboration, Research and Information Fluency, Critical Thinking, Problem Solving, and Decision Making, Digital Citizenship; and Technology Operations and Concepts (International Society for Technology in Education [ISTE], 2013) (see Appendices A and B).

Parallel to the 21st Century skills, 21st Century technology, then, becomes the conduit to support, enhance, and enable teachers and students to acquire the desired skills. Educators naturally assume the lead for implementing, integrating, and modeling the available technology (e.g., computer, laptop, Smart Board, tablets, Web 2.0), thus, their attitudes and experience carry the full weight regarding the introduction of certain technologies. Kopcha's 2012 study highlighted the positive effects sustained professional development had on technology integration and how the professional development affected teachers' attitudes towards common barriers such as time, access, and lack of skills or knowledge. Kopcha found that "situated professional development activities" (p. 1118) played key roles in teachers' perceptions of the barriers, with a mentor-style environment positively impacting the teachers' views of access, skills, and knowledge. Yet, despite the training, mentoring, and development of positive routines and attitudes towards the majority of barriers, teachers' maintained the negative perceptions

towards time barriers. Further, Teo's 2012 study focused on the factors impacting teachers' intentions towards technology use. The author utilized the Technology Acceptance Model that "specifies the relationships among perceived usefulness, perceived ease of use, attitude towards use, and behavioral intention to use technology" (p. 2433) and reported that, indeed, "perceived usefulness, attitude towards use, and facilitating conditions have direct influences on behavioral intention to use technology" (p. 2437). For example, with direct influences, Teo reported that if teachers' perceive the technology as useful for increasing their productivity, their intentions to utilize the technology increase significantly. The two studies (Kopcha and Teo) bear resemblance, as they represent a known body of available research focused on attitudes and perceptions towards technology integration within urban/suburban schools with open access to the new technologies.

Sufficient research posits the obstacles and barriers, both perceived and literal, regarding technology integration within urban/suburban, high-populated settings with access to considerable 21st Century technology and support. The questions, then, segue to the scant research targeting less-populated, rural schools' approach to technology integration. How may underrepresented (e.g., low enrollment, budget restrictions, rural location, specialized curriculum) schools implement technology in tandem with certain embedded barriers such as location, population, funding, and unique curriculum standards? Moreover, when the populated, technology-rich schools and educators struggle with technology integration, how may the findings apply to the underrepresented schools? This case study, then, focuses on 21st Century technology integration within a charter school that utilizes a unique place-based curriculum supplemented by the Expeditionary Learning Outward Bound approach to education. This case study aims to unearth the potential barriers and challenges of technology integration unique to

the charter school's curriculum, and how educators integrate technology in support of 21st Century skills within their daily curriculum.

Review of Literature

Today's educators face unique expectations compared to earlier generations of teachers, in that schools must educate students on the skills required to evolve into globally aware individuals in a digital society (Ritzhaupt, Dawson, & Cavanaugh, 2012). Creativity and innovation, communication and collaboration, research and information fluency, critical thinking, problem-solving, and decision making, digital citizenship, and technology operations and concepts frame the behavior and skills desired in today's learner (ISTE, 2013). Further, the teacher assumes the lead role as a conduit for modeling and utilizing the appropriate tools to support the desired 21st Century skills, such as Web 2.0 tools, learning management systems, virtual learning environments, mobile learning devices, and supplied classroom technology like the interactive white board, computer, laptop, and iPad.

Research studies that reported positive results. Warschauer, Grant, Del Real, and Rousseau (2004) investigated successful laptop programs in K-12 schools, specifically, how the laptop programs promoted academic literacy among ELL students in two diverse elementary schools. First, an experienced language arts educator implemented the one-to-one laptop program through thematic literature units ripe with technology usage, where the authors' reported that "students are not taught technology in isolation" (p. 528). The educator supported "cognitive mapping software" (p. 529) as a tool for students to gain understanding and organization of their readings, while utilizing extension projects requiring the use of Microsoft PowerPoint and Excel. With the second school, Warschauer et al. focused on the representation of learning through media that supported the school's educational reform effort with the Expeditionary Learning Outward

Bound model. Interdisciplinary teaching teams collaborated on the 8 -12 week Expeditionary Learning units where the culminating expedition product showcased multiple media formats. Specifically, Warschauer et al. reported that students "working in a representation and media rich learning environment had important advantages for the diverse students, and especially ELLs" (p. 534). In conclusion, the authors' reported that both schools utilized technology to an eminent degree, where technology was "used to apprentice students into academic literacy though promotion of independent reading, support for language scaffolding, involvement in cognitively engaging projects, and student analysis and creation of purposeful texts in a variety of media and genres" (p. 535).

A study by Wake (2012) focused on digital storytelling within a rural community school with limited technology. Specifically, Wake explored how digital storytelling allowed the students to express their knowledge, self-growth, and personal development. Reporting that traditional writing formats would have also allowed the students to share their perspectives, Wake stated that the digital storytelling process, instead, offered the students an authentic audience (classmates, parents, community members, public) where the students could "recognize their product as something worth sharing with others interested in their message in a social context" (p. 35). Wake concluded that the students' utilized technology outside the classroom; thus, the school should recognize the importance technology plays in the development and self-growth of adolescents.

Perkins, Hazelton, Erickson, and Allan (2010) focused their research on the spatial thinking of middle school students within a place-based curriculum. The students, as a pretest, were asked to draw a memory map based on the question, "If you were a bird flying over the schoolyard, what would you see?" (p. 214). The students, then, completed an introductory

lesson on GIS/GPS with basic geospatial concepts that enabled them to collect physical data on the trees and input into the My World GIS software creating a tree inventory of their schoolyard. The authors concluded that the GIS/GPS activities reinforced and improved the students' spatial awareness, particularly as the GIS/GPS related to the real-world, authentic learning emphasized by the place-based curriculum.

Northrup and Killeen (2013) looked at the potential with iPad and applications (apps) for building early literacy skills. They suggested teachers follow an instructional framework that includes specific steps: Step 1: Teach the targeted literacy skill without the application, Step 2: Explain and model, Step 3: Guided practice with the application and with the targeted literacy skill, Step 4: Independent practice with the application. Northrup and Killeen cautioned teachers to "First, teach the literacy concept using explicit instruction before using the app. Apps provide plenty of time for practicing literacy concepts, but should not be substitutes for directly teaching concepts" (p. 533). The authors' admitted excitement with the iPad's capabilities both as a motivational and instructional tool, yet they reinforced their previous statement regarding the importance of explicit literacy instruction with key literacy components before utilizing the iPad and applications.

The study by Beschorner and Hutchison (2013) added to the research of the iPad as a viable literacy teaching tool in early childhood education. Focused on two pre-school classrooms, the authors supplied the teachers with iPads and personally selected the applications due to the teachers' unfamiliarity with the iPad. Initially, the teachers' utilized writing and speaking applications then gradually introduced applications that encouraged listening and print awareness, with applications allowing students to write, speak, and listen introduced last. After seven weeks of twice weekly data collection, the results highlighted the potential of iPads or

similar tablets as flexible instructional tools that support emergent literacy skills. With the ability to manipulate letters on-screen, support collaborative learning, and connect reading, writing, listening, and speaking skills, the iPad proved a powerful, engaging technology for early literacy skills.

An additional exploratory study by Hutchinson, Beschorner, and Schmidt-Crawford (2012) focused on a 4th grade teacher's desire to integrate digital technology within her literacy instruction. The teacher's goals included utilizing the iPads to enhance student instruction and introduce them to new 21st century literacy skills, while continuing to teach the print-based literacy goals outlined in her curriculum. After first ascertaining the learning goals and desired learning experiences, the authors would select appropriate applications that would best assist the teacher with attaining the learning goals. The three-week study covered three specific learning experiences: #1. Using the reading comprehension strategy of sequencing, Application used – Popplet, which is a graphic organizer tool, #2. Independent Reading, Application used – iBooks, which is a virtual bookshelf for storing books purchased from the iBookstore, and #3. Using the reading comprehension strategy of visualization, Application used – Doodle Buddy, where the user may use a stylus or finger to paint and write, with additional features such as multiple colors, stamps, and backgrounds. The authors found the teacher and students preferred the Popplet application over traditional print graphic organizers because they could add and delete as desired, with no adherence to certain layouts or plans. Further, the students learned how to navigate the different features of the iBooks such as "to spontaneously record notes using the virtual sticky note function" (p. 18). Students reported Doodle Buddy allowed for multiple revisions and illustrations when creating images that best represented their given sentence or paragraph. Overall, the authors found the teacher successful in curricular technology integration,

particularly when she "thought about what she was teaching (i.e., literacy content knowledge), how she could best teach it (i.e., pedagogical knowledge), and how the technology (i.e., technology knowledge – iPads and apps) could be used to support student learning" (p. 22).

Research studies that reported potential obstacles and challenges. The past decade exhibited vast classroom technology growth, with numerous studies focused on the actual integration and usage of supplied technology (Ritzhaupt et al., 2012). Despite considerable money and time investments, schools struggle with the realities of technology integration that facilitates learning within embedded pedagogies (Plesch, Kaendler, Rummel, Wiedmann, & Spada, 2013). In Erişti, Kurt, and Dindar's 2012 study, one focus group centered on the teachers' difficulties with classroom technology integration. Teachers cited failure to stay atop current technology, failure to use current technologies, and ineffective use of technology as main obstacles, with one educator reporting the responsibility of technology integration added to their workload, "Now, we have another area of responsibility determined for us" (p. 3).

Teo's 2012 study reported similar findings related to educators' frustrations with technology integration, but posited that the proper technical support and human resources could encourage successful technology experiences which could then lead to increased positive feelings towards technology use in the classroom. Further, Lee (2012) studied educators as they utilized a "visual programming environment" (p. 528) created specifically for users unfamiliar with computer programming. Lee posited that educators empowered with designing "educational software applications" (p. 529) specific to their instructional needs exhibited increasingly positive attitudes toward technology integration.

Fessakis, Gouli, and Mavroudi's 2013 study looked at kindergarteners' problem-solving components by introducing a "Logo-based" (p. 87) computer programming environment

designed specifically for children. Fessakis et al. questioned: "Are kindergarten children capable of solving problems in the specific programming environment? What kind of problems related to the use of the software do they face? Do children enjoy working with the programming environment?" (p. 89). Though children exhibited eagerness with the format, the authors' concluded that the software interface design must eliminate specific task difficulties, as evidenced by the children struggling with familiarization of the environment, decoding navigation symbols, and deciphering orientation directions.

Apart from research addressing both the challenges and successes with K-12 classroom technology integration, Oliver, Osa, and Walker's 2012 research study considered how teacher preparation programs equipped teachers with sufficient technology skills to utilize and integrate new technologies within their curriculum. Through a survey of Professional Education Programs Unit faculty that addressed, among several issues, the actual instructional technologies employed, what instructional technologies the faculty taught their education students for personal use and in their prospective P-12 classrooms, and what instructional technology the faculty felt students were most and least comfortable using, Oliver et al. suggested that teacher preparation program faculty held essential roles in showcasing successful technology integration. As examples for their education students, the faculty must adhere to the assertion that "Teachers teach the way they were taught" (p. 294).

Hew and Brush (2006) analyzed previous research studies for general barriers affecting technology integration and the proffered strategies to overcome those barriers. They classified the 123 barriers identified in the literature reviews into six fundamental categories: "(a) resources, (b) knowledge and skills, (c) institution, (d) attitudes and beliefs, (e) assessment, and (f) subject cultures" (Hew & Brush, 2006, p. 226). Specifically, the lack of technology devices,

access, definitive technology skills and knowledge, time, and support dominated the barrier findings. Their research uncovered various strategies to address the barriers, such as creating a "shared vision and technology integration plan" (p. 233), advancing technology integration through one or two subjects at a time that assures adequate access for teachers and students, establishing technology in the classrooms versus a computer lab for additional access, teacher collaborations to assist with time issues, and utilizing student assistants for technical support.

An earlier discussion by Ertmer (1999) and referenced by Hew and Brush categorized the barriers into first and second order barriers. The author defined first order barriers as "extrinsic to teachers" (p. 50), such as equipment, time, training, and support. Second order barriers, then, related to barriers that "interfere with or impede fundamental change (p. 51). For example, Ertmer posited that teachers' attitudes and beliefs with teaching methods, practices, assessments, and management styles presented difficult barriers, as they were "personal and more deeply ingrained" (p. 51). Further, the relationship between first and second order barriers conferred an unclear and complicated understanding versus a straightforward perception that to eliminate a first order barrier translated into successful technology integration. Ertmer discussed the importance of developing "a vision of how to use technology to achieve important educational goals" (p. 54), with modeling, reflection, and collaboration suggested as further avenues to overcome the barriers. Moreover, the author presented unique recommendations to address access (fund-raisers, donations, grants; maximize available technology through central location), time (extend class time or "block scheduling" (p. 56); provide for professional and curricular development), training (pair students and teachers as "workshop participants" (p. 56); provide access to multiple training opportunities), and support (on-site troubleshooters, volunteers, student assistants, and online help).

Reviewing disparate research studies spotlighting technology integration unearthed one prevailing trend: the majority of research conducted within an urban/suburban school setting with sufficient 21st Century technology outweighed research focused on rural, non-traditional educational settings.

The North Routt Community Charter School History and Curriculum

School History

The North Routt Community Charter School was founded by a group of parents and community members concerned with the extended bus commute to town and the desire for a community-based school. The charter school opened in the fall of 2001, with classes taught in an early 1900's building, augmented by a barn and a yurt. Today, though part of the school district, the charter school staff control the day-to-day operations under the philosophy set forth by the charter school's board of directors:

- Students will exercise self-discipline and focus on achieving individually established dreams and goals.
- Students will have the self-esteem to live with dignity and be proud of their accomplishments.
- Students will learn they are socially responsible community members and leaders who will use their core values and individual talents to inspire others throughout their lives.
- Students will know that knowledge is a powerful and essential tool to succeed in any aspiration.

The charter school's vision includes references to people who value the environment and historical significance, with a commitment to the children and community (both local and global). The vision points to each individual achieving his/her highest potential in a positive

(can-do), goal-oriented, nurturing, and secure atmosphere (North Routt Community Charter School [NRCCS], 2013). Through the place-based, Expeditionary Learning Outward Bound approach to curriculum emphasizing community, collaboration, and character development, the charter school focuses on the stated vision, goals, and philosophy supported by the unique curriculum.

School Curriculum

The charter school utilizes the place-based approach to education supplemented with the Expeditionary Learning Outward Bound principles. Wake's 2012 study reported that place-based learning utilizes the physical community and people to inform the practice, as context is critical with experiential learning. In his 2006 study, Kemp referred to place-based education as an approach that utilizes environment as curriculum, which complements the Expeditionary Learning Outward Bound (see Appendix C) approach to education. Founded by Kurt Hahn (as cited in Pedrosa de Jesus, Almeida, Teixeira-Dias, & Watts, 2007) and built on 10 design principles that reflect Hahn's educational values and beliefs, Expeditionary Learning schools challenge students to think critically and assume active community and classroom roles (Expeditionary Learning, 2013). Expeditionary Learning Outward Bound and the place-based approach to education emphasize character development, with educators and students engaging with the local community to develop more "authentic forms of teaching and learning" (Smith, 2007, p. 191).

In Hallar, McCubbin, and Wright's 2011 study, "Curriculum in High Altitude Environments for Teaching Global Climate Change Education (CHANGE)," they focused on 5th and 6th grade students from Steamboat Springs, CO, who skied or snow shoed to the Storm Peak Laboratory to conduct climate change research. Hallar et al. highlighted the place-based

curriculum as vital to rural communities, as they lack access to urban areas that may offer educational opportunities such as field trips. Further, Jenning's, Swidler's, and Koliba's 2005 study brought forth the process of actually "embedding place-based curriculum within the state of Vermont's educational policy" (p. 45). The study considered the conflict or complement place-based curriculum presented to standing state policies, as the place-based approach "asked educators to connect with the communities (contexts) and utilize them in their teachings" (p. 47).

Research unearthed limited studies related to technology integration in place-based educational practices, particularly the Expeditionary Learning Outward Bound approach. Though limited in scope, the research reveals certain frameworks, pedagogies, attitudes, and conditions ripe for integrating 21st Century skills and technology. Kemp's 2006 study referred to place-based education as an approach that utilizes environment as curriculum. Further, built on 10 design principles that reflect the educational values and beliefs of Kurt Hahn, founder of Outward Bound, Expeditionary Learning schools focus on:

1. Primacy of Self-Development
2. Having of Wonderful Ideas
3. Responsibility for Learning
4. Empathy and Caring
5. Success and Failure
6. Collaboration and Competition
7. Diversity and Inclusion
8. The Natural World
9. Solitude and Reflection
10. Service and Compassion

To potentially facilitate the 10 stated design principles, technology, then becomes a powerful conduit for expressing personal learning and reflection. Digital storytelling, video and pod casts, website design and implementation, virtual learning environments, and mobile devices present educators and students with exemplar modes of representation. For example, and in support of various design principles such as the Primacy of Self-Development, Responsibility for Learning, and The Natural World, Lai, Yang, Chen, Ho, and Liang's 2009 study focused on how mobile technologies may motivate and guide students in experiential learning. Lai et al. defined mobile technology capabilities as providing "instant recording functionality for note taking equipped with plug-in cameras and sound recording functions" (p. 328). Utilizing the mobile technologies of Personal Digital Assistants (PDAs) vs. pencil and paper, the two groups of students followed a pre-determined field-trip learning activity in a community garden. Whereas the pencil and paper group drew pictures with written narratives, the PDA group captured photos and sound, with the option to access additional online learning materials. Results highlighted that the students with PDAs demonstrated greater knowledge creation compared to the students without. However, Lai et al. reported that it was the "interplay between technology and pedagogical practice that affords possibilities for better experiential learning" (p. 335).

The virtual learning environment proves a powerful venue for learners to exercise authentic problem-based action learning while promoting motivation and relevance using unstructured, real-world settings (Dass, Dabbagh, & Clark, 2011). The virtual learning environment, then, encourages several of the 10 addressed design principles such as the Having of Wonderful Ideas, Empathy and Caring, Success and Failure, Collaboration and Competition and Diversity and Inclusion. Warburton's 2009 study identified key aspects of the virtual learning experience, such as exposure to authentic content and culture, promoting a sense of

belonging and community, and the opportunities for creation and ownership of the learning environment. Furthermore, Dass et al. (2011) studied the collaborative learning approach that "emphasizes the joint construction of knowledge, social negotiation, and student reliance of peers and teachers as learning resources" (p. 326). The study affirmed that students felt the virtual learning environment assisted them in working effectively as a group, with the researchers reporting the use of several different areas dedicated to a common campus area, collaborative area, recreation area, and a lecture area. Moreover, the virtual learning environment supported synchronous communication and social interaction, with students reporting a heightened sense of awareness, presence, and communication.

The charter school's unique educational setting, approach, and principles, then, inform the foundation of the case study framework regarding technology integration within the curriculum.

Statement of Problem

Specifically, this study focused on the integration of 21st Century technology as determined by the International Society for Technology in Education (ISTE) Standards•T within a place-based curriculum framework supplemented by the Expeditionary Learning Outward Bound approach to education as presented in a rural Colorado mountain community K-8 charter school. The case study involved an in-depth look regarding how 21st century technology integration affected the place-based, Expeditionary Learning Outward Bound approach to teaching and learning practices specific to the North Routt Community Charter School (NRCCS). The particular research aimed to inform or enhance the charter school's current practices by questioning:

1. How has the charter school integrated 21st Century technology in support of 21st Century skills as identified by the International Society for Technology in Education (ISTE) Standards•T ?
2. How has 21st Century technology integration enhanced or challenged the charter school's place-based, Expeditionary Learning Outward Bound curriculum?

Method

The case study focused on the integration of 21st Century technology within a place-based approach to education supported through the Expeditionary Learning Outward Bound (ELOB) framework as presented in a rural, mountainous Colorado community K-8 charter school.

Sampling Procedures

Purposeful sampling framed the sample selection, specifically unique and convenience sampling due to the unique charter school curriculum with the inherent challenges (budget, low staff count, etc.) of integrating 21st Century technology and the charter school's location. The sample size criteria included an educational institution amenable to a non-staff member's inclusion within daily operations, and a location suitable and safe for travel in extreme winter conditions. The charter school fit the two criteria, with the entire staff (one director, seven teachers, and two paraprofessionals) selected due to the small number of educators in the setting.

Research Setting

The case study focused on the North Routt Community Charter School (NRCCS) located approximately 15 miles north of Steamboat Springs, CO, in a small, rural, mountainous community. The school supported 10 staff members (see Appendix D) and 81 students, with the majority of students hailing from a ranching background.

The charter school was originally founded by a group of parents and community members concerned with the extended bus commute to town and the desire for a community-based school. The charter school opened in the fall of 2001, with classes taught in an early 1900's building, augmented by a barn and a yurt. Today, NRCCS operates out of a state-of-the-art award-winning 12,773 square-foot building (see Appendix E). Determined to include community resources and with an average temperature of 41.9° F and average snowfall of 91.3″ (World Media Group, LLC, 2013), the school's design followed an environmentally responsible, green model that gained recognition and Platinum Certification determined by the Leadership in Energy and Environmental Design (LEED) standards that "help building owners and operators find and implement ways to be environmentally responsible and resource-efficient" (U.S. Green Building Council [USGBC], 2013).

Research Design

The research design utilized the qualitative study method that focused on the process, meaning, and understanding, or, as Stake (2010) reported, "We should look both for the general and the particular" (p. 1316). Specifically, the qualitative design chosen for this study utilized the case study approach with the researcher as the primary data collection instrument to collect in-depth, extensive data within a bounded system and defined time-frame of six weeks. The researcher deliberately incorporated multiple sources of data collection (interviews, observations, demonstrations) to better understand the case study components and increase validity (triangulation) of the findings.

One data collection method included the use of a researcher-developed list of interview guide questions (see Appendix F) to better understand the participants' personal experiences, interpretations, and feelings with the various facets of technology integration. In support of the

interview data, this researcher utilized a Follow-up Interview Guide Form (Appendix G) with the participants, when necessary, that allowed for clarification and to record added information, thoughts, interpretations, and corrections. Additionally, the International Society for Technology in Education (ISTE) Snapshot Assessment Instrument facilitated the observation process through the tool's objective, focused questions. Further, this researcher analyzed two available ongoing second semester assessment projects for technology facets and to determine the potential for technology by talking with the teachers and personally observing: Did the project exhibit technology integration? Could technology have enhanced the project? Could the Outdoor Education and Wellness trips have incorporated technology within their reflections? Is technology integration a feasible goal for the outdoor trips?

According to Merriam (2009), a case study encompasses inherent characterizations described as particularistic, descriptive, and heuristic. The particularistic aspect points to the focus on a particular situation, event, program, or phenomenon, with the descriptive facet zeroed in on a rich, "thick" (p. 43) description of the study focus. In this study the researcher examined the charter school's technology integration, including the possible obstacles and challenges, to better develop research that encompassed a "holistic, detailed, rounded, and contextual," (Stake, 2010, p. 327) approach.

Instrumentation

This researcher utilized the qualitative data collection method. Qualitative data collection included on-campus individual staff interviews (one initial and one follow-up per staff member), individual teacher in-class informal observations and demonstrations, and document and artifact reviews in order to reveal the teachers' and director's viewpoints regarding technology integration within their place-based, Expeditionary Learning Outward Bound approach to curriculum.

Interviews. The selected interview framework for this case study included a mix of in-person semi-structured and unstructured/informal interviews. This researcher developed a list of interview guide questions (see Appendix F) to better understand the participants' personal experiences, interpretations, and feelings with the various facets of technology integration. The interview guide questions required review for clarity and relevance by an individual unrelated to the study yet familiar with 21st Century learning and skills as identified by the International Society for Technology in Education (ISTE) Standards•T; thus, a Steamboat Springs School District media specialist with over 20 years' experience reviewed and assisted with revisions.

Upon IRB approval in mid-February, initial individual staff interviews commenced utilizing the Interview Guide that focused on the teacher's current 21st Century technology use, opinions, and relevant training/professional development; future or follow-up interview questions depended on initial interview responses (see Appendix G).

Observations. Upon receiving the director and the IRB's approval, this researcher spoke with the director and participants regarding observation schedules. They agreed to observations conducted any day or time, with the exception of testing dates May 11 -13 and 18 – 20. This researcher observed one formal lesson/activity per teacher while utilizing the International Society for Technology in Education (ISTE) Snapshot Assessment Instrument (see Appendix H).

Documents and Artifacts. With the Expeditionary Learning approach to curriculum, student-engaged assessments comprise the primary assessment method. Ron Berger, the Chief Academic Officer for Expeditionary Learning, refers to the process as requiring a set of interrelated strategies and structures and "a whole-school culture in which students are given the respect and responsibility to be meaningfully engaged in their own learning," (Berger, Rugan, & Woodfin, 2014, p. 234). This researcher analyzed two available ongoing second semester

assessment projects for technology facets and to determine the potential for technology by talking with the teachers and personally observing: Did the project exhibit technology integration? Could technology have enhanced the project? Could the Outdoor Education and Wellness trips have incorporated technology within their reflections? Is technology integration a feasible goal for the outdoor trips?

Procedures

Upon obtaining the director's written consent and IRB approval followed by the signed consent forms (see Appendix I) from staff members, the research study commenced with this researcher presenting the affirmed proposal in a mid-February staff meeting that allowed for questions, concerns, and suggestions. Time-frames, expectations, limitations, scheduling, and additional necessary facets informed the discussion.

After the staff meeting, the researcher contacted each participant through a short email requesting an interview. The seven teacher interviews were conducted individually in their classrooms according to their particular schedule, with no additional individuals present. The two paraprofessional and director interviews were interspersed within the same timeframe as teacher interviews and ranged from 13 minutes to 37 minutes depending on initial answers and the researcher's follow-up questions. The researcher utilized the Interview Guide for questions and recorded the interviews on a digital recorder device that were later transcribed onto a word document and saved on the researcher's personal computer and thumb drive. After completing the interviews, the researcher set-up an observation time according to the teacher's preference.

The participants agreed to informal observations conducive to the researcher's requests, with the exception of testing dates May 11-13 and 18–20. This researcher attended six classroom observations and utilized the International Society for Technology in Education

(ISTE) Snapshot Assessment Instrument to assist with observations and objectiveness. This researcher then wrote and/or dictated detailed observation notes of the setting, the people, and the activities, with direct quotes and researcher's comments plus drawings, diagrams, and relevant pieces of data that informed and enhanced the observation checklist. The data were recorded in a word document and stored on the researcher's personal computer and thumb drive.

This researcher studied two available 2013-2014 projects and assessments (e.g., ant colony depiction and an insect greeting card) to look for technology integration and to suggest (upon case study completion) potential 21st Century technology that may have enhanced the project. This researcher recorded the type of project and teacher expectations within the existing research notes for future analysis. This analysis of specific expedition assessments offered additional insight into technology integration within the curriculum, while keeping in mind that Expeditionary Learning student-engaged assessments require multiple practices. As Berger further stated, "It is an approach to teaching and learning that equips and compels students to understand goals for their learning and growth, track their progress toward those goals, and take responsibility for reaching them," (Berger, Rugan, & Woodfin, 2014, p. 235).

The researcher chose to attend two of the Friday Outdoor Wellness and Excursion trips for in-depth observations and field study and to better understand how the trips support the Expeditionary Learning principles. The observations and notes were later recorded within the existing research notes for further analysis and to categorize whether or not the excursions incorporated technology at any time in the process. Specifically, this researcher desired insight into the potential for technology integration or if integration was an appropriate goal for this aspect of their curriculum. The excursion trips inform the Expeditionary Learning curriculum by incorporating student requirements of journal writing, drawing, and self-reflection, which,

initially, appear ripe for technology inclusion such as an online portfolio for Outdoor Education and Wellness reflections The first trip involved a whole-school cross-country skiing excursion at the local golf course and offered insight into how the trip supported the 10 Design Principles of Expeditionary Learning, particularly how the student relates to the natural world, deals with success and failure, and utilizes the solitude for reflection.

The second trip came at the end of the research study time-frame and involved the kindergarten class (11 total). The excursion required a 12-hour round-trip to the Denver Butterfly Pavilion as the culminating event to the kindergartener's insect expedition. The teacher presented statements such as "I wonder…?" and "I notice…?" to guide the students' attention and encourage the students in the design principles of the Primacy of Self-Discovery, Responsibility for Learning, and the Having of Wonderful Ideas.

The research study culminated with interview and document/artifact member checks and ongoing data analysis, organization, and interpretation in preparation for the final research study report.

Data Analysis

This researcher combined the day-to-day recorded observations, interviews, and document/artifact analysis with researcher notes and interpretations to allow for simultaneous, ongoing data reconstruction and analysis. Bogdan and Biklen (2007) suggested an outline format for simultaneous data collection and analysis. The authors' suggested planning data collection sessions according to findings in previous observations, including numerous observer comments and memos, and "visualizing to clarify the analysis" (p. 172), thus, compounding the importance of simultaneous data collection and analysis**.** Moreover, to strengthen validity and

credibility this researcher utilized "member checks" (Merriam, 2009, p. 217), where participants reviewed this researcher's analysis and interpretations for misunderstandings and clarifications.

To commence the analysis, this researcher organized and sorted the data according to type (e.g., interview, observation, field notes, documents/artifact) to create a case study database, with color-coding and an Excel spreadsheet utilized as organizational tools. Next, within each topic this researcher further analyzed and refined potential themes and commonalities while incorporating personal narratives and editing redundancies. Interpretations, synthesis, and the actual writing process concluded data analysis.

In summary, the analysis process began at the basic level of chronological or topical organization recorded in a descriptive narrative (concrete description of observable data) to a less concrete format that utilized classification of categories or themes (Merriam, 2009). The end result created organized and manageable case study data so this researcher could easily access, analyze, and interpret the data for insights into the two stated research questions that focused on the charter school's integration of 21st Century technology within their curriculum and how technology integration enhanced or challenged the curriculum.

Results

The particular research aimed to inform or enhance the charter school's current practices by focusing on two questions:

1. How has the charter school integrated 21st Century technology in support of 21st Century skills as identified by the International Society for Technology in Education (ISTE) Standards•T ?
2. How has 21st Century technology integration enhanced or challenged the charter school's place-based, Expeditionary Learning Outward Bound curriculum?

The researcher-designed Interview Guide utilized 15 questions to elicit responses focused on technology, whereas the observational analysis involved a separate process where this researcher employed the International Society for Technology in Education (ISTE) Snapshot Assessment Instrument as an objective tool for collecting data during brief classroom visits. The categories involved access, standards and curriculum, type of student interaction, and alignment issues, and subsequently supported the interview analysis. Finally, the document and artifact data collection analysis focused on personal field notes from the two Outdoor Education and Wellness (OEW) trips and two examples of student-engaged project assessment, with this researcher viewing and handling the finished project, questioning the involved teacher, and determining the technology integration factor: Did the project exhibit technology integration? Could technology have enhanced the project? Could the Outdoor Education and Wellness trips have incorporated technology within their reflections? Is technology integration a feasible goal for the outdoor trips?

The first common theme to emerge from the data analysis showed that access to actual technology devices initially hindered and challenged the charter school's growth with 21st century learning. The director reported that to add to the charter school's initial five desktop computers, as the 7th/8th grade teacher at the time, he asked the school district "can we get some of your garbage computers?" The computers then resided in the attic of the old school and enabled the school to engage in first-time online testing.

With the new school completed in January 2012, the infrastructure allowed for greater bandwidth encouraging staff to write numerous hardware grants for a current total of 23 laptops and 18 iPads. Obvious funding issues highlighted one of the major hindrances to new technology, with the charter school relying on grants and donations for numerous technology

costs. As an example, the director referred to a local family whose $15,000 technology donation enabled the school to purchase flat-screen televisions, Apple TV, and teacher iPads.

An additional hardware facet included the decision against SMART Boards due to cost. The director and 3rd/4th grade teacher spoke of the approximately $1000 cost per bulb that typically required replacement every 14 to 16 months. The director admitted he was part of the big push for SMART Boards, but after more research discovered the high costs of equipment upkeep and support. He stated, "The bulbs blow-up and they're about $1000 a piece, so as a charter school we can't deal with that possible $6000 cost." Another unique argument against SMART Board incorporation involved the green school design and the emphasis on natural light; therefore, the classrooms' immense amount of light would not allow for SMART Boards, and staff did not want to hinder the natural light for technology. Yet, four of the ten educators admitted they would readily welcome a SMART Board if there were no light or cost limitations.

With the aforementioned $15,000 donation, the director and staff elected to purchase eight flat-screen televisions with Apple TV, eight document cameras or HoverCams, and eight teacher iPads. The document cameras, or HoverCams, allow an updated version of the traditional overhead projector, but with an engaging, 21st century component. The HoverCam manufacturer claims the document camera as "the world's fastest 5 megapixel USB document camera for education, which means clearer images during classroom instruction. This multi-functional device can capture tiny details or A3 documents so teachers can show a whole textbook clearly" (Pathway Innovations and Technologies, Inc., 2014). The charter school teachers expressed extreme satisfaction with the HoverCam, with one teacher explaining that the document camera "fits really well; it's one more dimension for the kids, whether they're a visual or auditory learner it's one more way of seeing it."

The Apple TV wirelessly streams the Apple iPads or iPhones to mirror the screen of the devices onto the flat-screen television. The teachers may wirelessly mirror their iPads or iPhones or hook their Mac laptops to the Apple TV and mirror their laptop screens. The seven teachers use the devices daily, but admit they have to incorporate time into their lessons for hooking up the laptops, thus, iPads remain the teachers' number one choice for mirroring.

Teachers' readily demonstrated the Apple TV lap-top hook-up and iPad wireless process that exhibited their fluency with the technology, while incorporating the technology within their lessons and activities. When utilizing the International Society for Technology in Education (ISTE) Snapshot Assessment, this researcher observed teachers' comfortable with their chosen technology devices, particularly the iPad, which supported their interview statements referring to iPads as their favorite device.

Comparing the 10 participants' responses, activities, lessons, and hardware use, iPads were the overwhelming hardware choice, with YouTube, iPad applications, and subject-specific websites employed as the three main technology tools. Classroom teachers incorporated iPads into their daily lesson targets (objectives or standards term used by Expeditionary Learning) by mirroring content from websites and applications. For example, the learning targets and evidence of activity alignment were apparent within the technology integration as the 7th/8th grade teacher engaged students with a website, Flocabulary (Flocabulary, 2014), promoting vocabulary lessons through rap songs that allowed Mr. B. to simultaneously display the website lesson that focused on words such as amiss, avail, bizarre, chastise, contagious, and preposterous, while ensuring students completed the supporting written activities. Moreover, the special education resource teacher, Ms. C., reported using iPads for students requiring reading and math support. Specifically, she spoke of the Sushi Monsters application where she controls the curriculum by

inputting the daily content in relation to the student. In a simple yet unique fashion, Ms. C. utilized the iPad's recording capability to assist a student who exhibited distress with transitions between activities. Ms. C. recorded the students at snack time and on the playground, so when the student refused to leave the classroom for his one-on-one instruction, she played the pre-recorded activities and said, "When you come back we'll have snack time," while showing him the snack-time video. Ms. C. reported that "Transitions are no longer a problem because he knows what's next."

This researcher further compared the 5th/6th and 7th/8th grade teachers' responses and actions with iPads to that of the Kindergarten, 1st/2nd, and 3rd/4th grade classrooms and discovered the lower grade teachers utilized their iPads on a daily basis compared to two or three times a week for upper grade teachers. Mr. B., the 7th/8th grade teacher, stated that, "I'm a little more pencil and paper. I definitely use technology, but when kids do something I want them writing on a piece of paper." He further explained that the practice of writing incorporates components such as handwriting and spelling instead of "just kicking it [writing] over to the computer." This researcher ascertained that, though Mr. B. placed little priority on incorporating the iPads, he allowed his students to bring their electronic devices, "I say if they use it for educational purposes, by all means get your iPad out, or your phone out, or your scientific calculator. It's a lot of technology in their pockets!"

PowerPoints and YouTube videos comprised the main technology tools when participants answered and subsequently demonstrated how they incorporated technology into their daily curriculum. The 3rd/4th grade teacher considers herself the "queen of PowerPoints," but acknowledged her desire to learn 21st century tools and applications, particularly when referring to displaying the students' PowerPoints. When this researcher referred to Wikipedia, Weebly, or

Voice Thread as potential avenues, Mrs. C. admitted to no knowledge or exposure to the listed tools. Likewise, the 10 participants as a group answered "no" when asked if they were familiar with Web 2.0.

The unfamiliarity with Web 2.0 tools potentially influenced the lack of technology integration within the Outdoor Education and Wellness student reflection journals and the student-centered assessments utilized by the Expeditionary Learning curriculum. As an example, this researcher studied the 1st/2nd grade students' culminating projects for their ant expedition. The learning targets focused on community, including the various community members' roles and responsibilities. Utilizing actual ant farms in the classroom to represent communities, the students completed a multi-task project that exhibited the ant community's differing roles and responsibilities. The students collaborated within their groups to produce a poster board illustrating the ant colony, with the myriad tunnels and sections such as the "egg room," "nursery room," and "queen room." Colors and corresponding map symbols added to the detail and intricacy; thus, the student-centered assessment showcased their learning and understandings through several mediums excluding technology. The technology aspect included online research and YouTube videos for the teaching and learning, but lacked incorporation of online storyboards, digital storytelling, or design tools.

Parallel to the 1st/2nd grade assessments, for their insect expedition, kindergarten students researched their chosen insects and created greeting cards to sell at local businesses, with a field trip to the Denver Butterfly Pavilion as the culminating event. The kindergarten students, both at home and school, conducted online insect research to gather information and images for their greeting cards. Again, no technology informed the student-centered assessments though digital storytelling web sites such as StoryJumper (StoryJumper, 2014) or StoryBird (StoryBird, 2014)

remain intuitive, well-known digital tools that encourage younger children to create their own stories and projects.

In similar fashion, the outdoor excursions focused on the entire 10 Expeditionary Learning Design Principles through definite group design, learning targets, and reflection journals, but included no technology integration. Instead, this researcher evidenced vast support for the actual Expeditionary Learning Design Principles through individual group make-up that showcased the Responsibility for Learning where everyone learns both individually and as part of a group, Empathy and Caring with the older students mentoring the younger ones, and The Natural World where Expeditionary Learning schools believe "A direct and respectful relationship with the natural world refreshes the human spirit and teaches the important ideas of recurring cycles and cause and effect" (Expeditionary Learning, 2014). Upon returning to the school, the students recorded thoughts and ideas in their reflection journals that supported the design principle of Solitude and Reflection that encourages both students and teachers to take time alone to explore their own thoughts, make their own connections, and create their own ideas before sharing with other students and adults (Expeditionary Learning, 2014). This researcher subsequently dissects the lack of and opportunities for technology integration in the Discussion section of this paper.

The eight participants with undergraduate college degrees, including degrees from 2005 to 2011, revealed that their programs supplied no exposure to integrating technology within learning environments aside from word documents or spreadsheets. The director categorized the last year of his master's program as online due to the professor's use of email and discussion threads, but acknowledged no exposure with technology integration in either his undergraduate or graduate programs. The special education resource teacher, Ms. C., referred to lectures

focused on assistive devices, but obtained no further training or teaching with technology integration, though she graduated as recently as 2008.

The 10 participants reported no professional development or workshops devoted to technology integration or 21st century skills. When asked about their learning experience with new technology, several reported, "wiggling my way through," "getting around until I figure it out," "trial and error," and "it's more of survival." Additionally, when asked their feelings on integrating new technology, the majority of teachers referred to ease of use and a required intuitiveness to the technology before they would consider integration.

Discussion

Summary

The case study involved an in-depth look regarding how 21st century technology integration affected the place-based, Expeditionary Learning Outward Bound approach to teaching and learning practices specific to the North Routt Community Charter School (NRCCS). The particular research aimed to inform or enhance the charter school's current practices by questioning:

1. How had the charter school integrated 21st Century technology in support of 21st Century skills as identified by the International Society for Technology in Education (ISTE) Standards•T ?
2. How 21st Century technology integration enhanced or challenged the charter school's place-based, Expeditionary Learning Outward Bound curriculum?

Upon receiving approval from the director and IRB and obtaining permission from the staff participants, this researcher conducted interviews and observations, document and artifact analysis for data collection. Interviews ranged from 13 to 37 minutes and revealed categories

related to incorporating initial hardware devices, obtaining grants for additional hardware, and the selection of appropriate tools to complement the devices. The charter school staff pinpointed several of the first and second order barriers addressed by Ertmer (1999), such as access, time, training, and support. Teachers revealed their frustrations with time limits affecting technology application, mirroring the findings of Erişti, Kurt, and Dindar's 2012 study, where one educator acknowledged that technology integration added to their workload, "Now, we have another area of responsibility determined for us" (p. 3). The charter school's kindergarten teacher, when asked her feelings regarding new technology integration, answered, "My first instinct is like okay I have one more thing to learn, to put it on my to-do list." The teacher continued her explanation that once she "messed around" with the technology and gained confidence, she felt excitement instead of facing a to-do chore.

The lack of college-centered opportunities for teaching and learning and inexperience with new literacies and technologies emerged as two main themes. Oliver, Osa, and Walker's 2012 research study considered how teacher preparation programs equipped teachers with sufficient technology skills to utilize and integrate new technologies within their curriculum. Oliver et al. suggested that teacher preparation program faculty held essential roles in showcasing successful technology integration. As examples for their education students, the faculty must adhere to the assertion that "Teachers teach the way they were taught" (p. 294). This researcher agrees with Oliver, Osa, and Walker's assertion and recognizes that a 100% failure rate with the 10 participants' in this case study regarding the lack of technology in their college teacher preparation programs adds to the discouraging research literature such as Oliver et al.'s findings.

The participants' positive views regarding laptop and iPad use were an enduring theme throughout the data collection process and analysis. With numerous applications and unique user ideas, iPads supported emerging readers and older students requiring additional assistance, while supplying the special education resource teacher an invaluable tool for behavioral situations. Numerous research studies exist supporting iPad classroom use, such as Northrup and Killeen's 2013 study that looked at the potential with iPads and applications for building early literacy skills. They suggested teachers follow certain outlined steps like teaching the targeted literacy skill without the application before introducing the technological aspect. The authors' admitted excitement with the iPad's capabilities both as a motivational and instructional tool, yet they reinforced the importance of explicit literacy instruction with key literacy components before utilizing the iPad and applications. This researcher observed one lesson where the kindergarten teacher unknowingly followed the best practices suggested by the authors when she introduced her students to certain blend sounds. The teacher taught the targeted literacy skill without the application; she explained and modeled the skill; provided guided practice with the application and with the targeted literacy skill, and, finally, allowed independent practice with the application

Further analysis revealed certain participants imagined a future with SMART Board integration, while the director pointed out the real-life budgetary concerns and environmental issues hindering integration. Additionally, individuals expressed the naturalness Expeditionary Learning presented for technology integration, while demonstrating their chosen strategies for incorporating online learning techniques. Ironically, this researcher studied two student-centered assessment projects, the ant community and insect expeditions, where 21st century tools would have integrated seamlessly with the desired end results. When researching an Expeditionary

Learning Outward Bound school, Warschauer, Grant, Del Real, and Rousseau (2004) reported that students "working in a representation and media rich learning environment had important advantages for the diverse students" (p. 534). To further demonstrate the potential of 21st century tools, a study by Wake (2012) focused on digital storytelling within a rural community school with limited technology. Specifically, Wake stated that the digital storytelling process, instead, offered the students an authentic audience (classmates, parents, community members, public) where the students could "recognize their product as something worth sharing with others interested in their message in a social context" (p. 35).

Interviews further revealed a desire for expanded learning opportunities with technology and assorted tools, while denouncing the lack of professional development or workshops available. Ertmer (1999) recommended that districts might consider "growing their own experts" (p. 56) by utilizing staff and community members to design and teach workshops, while also suggesting unique alternatives like pairing students and teachers in workshops for simultaneous learning and training. Though a dearth of professional development opportunities existed within the local district, the charter school staff supported the director's initiative with finding and supporting opportunities for technology teaching and learning. There was a sense of community and sharing resources, while acknowledging grants and private donations played major roles in technology advancement.

Observations revealed engaged, challenged students who seamlessly moved between pencil and paper and iPads or laptops. Observations also highlighted discrepancies between the upper grade teachers supporting students bringing their own devices for educational use, while neglecting to model their own technology integration on a daily basis. The ISTE Snapshot Assessment Instrument allowed this researcher insight with learning targets and aligned

activities, while combining an objective assessment tool in judging technology integration. During observations and interviews staff members eagerly demonstrated their expertise with mirroring from their iPads to the Apple TV and onto the flat-screen television. The document cameras, or HoverCams, allowed an updated version of the traditional overhead projector, but with an engaging, 21st century component.

Document and artifact analysis showcased the Expeditionary Learning 10 Design Principles through student-centered assessments. Students' created student-centered assessments with traditional poster board and paper, though the Internet became the conduit for their research and learning. PowerPoints showcased in-class learning, while the teacher acknowledged a desire for utilizing 21st century tools to exhibit the traditional PowerPoints.

The case study revealed a depth to the charter school's ability to integrate and utilize available technology beyond the initial impression. Ertmer's (1999) example of teachers and schools utilizing creative strategies to address certain barriers mirrored the charter school's ability to obtain grants and private donations highlighting the fact that "lack of easy access did not translate into a significant barrier" (p. 51). The Expeditionary Learning curriculum supported 21st century skills without the traditional public school's technology saturation of SMART Boards, computer labs, and expanded budgets. What began as admitted researcher bias or assumption toward limited technology in the charter school environment evolved into an earned respect for the innovativeness required to apply the limited technology in unlimited directions.

Conclusion

The case study and data analysis answered the two stated research questions:

1. How had the charter school integrated 21st Century technology in support of 21st Century skills as identified by the International Society for Technology in Education (ISTE) Standards•T
1. How 21st Century technology integration enhanced or challenged the charter school's place-based, Expeditionary Learning Outward Bound curriculum?

First, the charter school's Expeditionary Learning Outward Bound curriculum presented a natural conduit for technology integration in support of the International Society for Technology in Education (ISTE) Standards•T through their utilization of 21st century tools such as iPads, applications, laptops, and web sites. The curriculum supports teacher-developed resources versus textbooks; therefore, the Internet inhabited the main source for teaching and learning tools such as access to web sites, experts, videos, and research. The curriculum's 10 design principles incorporate collaboration, self-guided learning, unique ideas, and reflection, for example, which corresponded with ISTE's focus on student creativity and teachers as the designers, developers, and evaluators of authentic learning experiences.

Second, the findings revealed certain barriers or challenges as highlighted in question two. The lack of time, knowledge, technology-centered college preparation courses, and professional development opportunities comprised the main obstacles, with ease of use and limited devices referred to secondary, yet, paralleling the shortcomings, the findings demonstrated the participants' persistence and real-life skill with integrating the available technology in best practices to support the Expeditionary Learning curriculum. Chen and Liu (2013) reported on the digital divide between rural and urban environments in developing countries, which relates in a modest way to the uneven resources between traditional public schools and charter schools, though this charter school surmounts its ongoing technology

inequality with perseverance and the realities of grants and donations. Because Expeditionary Learning foregoes textbooks with self-discovery and self-guided learning or, as the 3rd/4th grade teacher stated, "We want the students to speak more than the teachers," basic technology integration with laptops and iPads became the conduits for research, access to experts, and discovery of a myriad of online resources, or, as Ertmer (1999) highlighted, the emphasis should be on "what we do with technology rather than on the kinds of equipment with which we do it" (p. 49). The North Routt Community School practices and attitudes parallel Ertmer's assertions on a daily basis through their grit and resolve to focus on the opportunities afforded through their existing resources versus an attitude of lack or entitlement.

At this writing, the charter school budget and environmental concerns do not support SMART Board integration or a computer lab, but the whole-school attitude supports the totality of existing technology with particular emphasis placed on discovering best practices support through any type of resources the staff find suitable and appropriate to meet the learning targets.

Implications

This research study accentuates the determination of a small, rural charter school to successfully integrate available technology while acknowledging budgetary constraints assume a major role in technology limitations. Participants, including the director, offered no excuses or apologies for the perceived lack of technology. Instead, the data collection methods unearthed a certain resolve to thrive and grow despite inherent obstacles and challenges. Today's instructional technology leaders and teachers could take notice of the North Routt Community Charter School's grit and resolve to utilize 100% available technology resources instead of calling for additional resources to advance technology integration. Understanding how to advance the given resources versus acquiring the latest and newest would allow educators the

time and confidence to integrate 21st century skills and tools to a depth unrealized in many public schools. One could imagine teacher preparation programs that actually integrate real-life technology situations and solutions, even showcasing humble charter schools that succeed with 21st century technology and skills integration despite a lack of technology. College teacher preparation programs should produce working examples of both extremes, the public schools with unlimited technological resources and the rural schools who take creativeness and inventiveness to new levels. Oliver, Osa, and Walker's 2012 study suggested that teacher preparation program faculty held essential roles in showcasing successful technology integration Overall, modeling 21st century skills and tools should be the minimum expectations at higher education institutions, yet it seems even that level remains unattainable for many.

The second major implication for this researcher involved the Expeditionary Learning curriculum, with its focus on self-guided learning and discovery, student-engaged assessments, and character traits, and the boundless opportunities for technology integration. The Expeditionary Learning whole-person real-world focus mirrors the 21st century skills supported through the International Society for Technology in Education (ISTE) Standards•T. The two entities intertwine in a symbiotic relationship that promotes higher order thinking, global awareness, responsibility for learning, and integrity in daily life. To consider the curriculum and standards as a nationwide, even global-wide, entity lends to an educational environment the majority of educators may not have imagined possible, much less thriving in a small, rural, mountainous charter school in northwest Colorado.

Limitations

The limitations or biases in this study included the researcher as a parent of two children at the selected charter school, which informed inferences and interpretations. Additionally, the

researcher approached the study as a proponent of 21st Century technology and skills due to extensive application of 21st Century learning and theories obtained from a M.Ed. in Instructional Technology and the current status as an Ed.S. Candidate in Instructional Technology. Further, the unique educational and environmental setting, curriculum approach, and small sample size inhibit the transfer of findings to a more traditional environment.

References

Berger, R., Rugan, L., & Woodfin, L. (2014). *Leaders of their own learning*. San Francisco: Jossey-Bass.

Beschorner, B., & Hutchison, A. (2013). iPads as a literacy teaching tool in early childhood. *International Journal of Education in Mathematics, Science, and Technology, 1*(1), 16-24.

Bogdan, R.C., & Biklen, S.K. (2007). *Qualitative research for education: An introduction to theories and methods.* Boston: Pearson.

Chen, R.-S., & Liu, I.-F. (2013). Research on the effectiveness of information technology in reducing the rural–urban knowledge divide. *Computers and Education, 63*(1), 437–445.

Dass, S., Dabbagh, N., & Clark, K. (2011). Using virtual worlds. *The Quarterly Review of Distance Learning, 12*(2), 95-111.

Erişti, S., Kurt, A., & Dindar, M. (2012). Teachers' views about effective use of technology in Classrooms. *Turkish Online Journal of Qualitative Inquiry, 3*(2), 30-41.

Ertmer, P. (1999). Addressing first and second order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61.

Expeditionary Learning. (2013). *Expeditionary learning core practices: A vision for improving schools.* Retrieved from http://elschools.org/our-approach/what-we-do

Expeditionary Learning Outward Bound. (2011). *Expeditionary learning core practices.* Retrieved from http://elschools.org/sites/default/files/Core%20Practice%20Final EL_120811.pdf

Fessakis, G., Gouli, E., & Mavroudi, E. (2013). Problem solving by 5-6 years old kindergarten children in a computer programming environment: A case study. *Computers & Education, 63*(1), 87-97.

Flocabulary. (2014). *Flocabulary is educational hip-hop*. Retrieved from http://www.flocabulary.com/3-wild-ride/.

Hallar, A., McCubbin, I. B., & Wright, J. M. (2011). Change: A place-based curriculum for understanding climate change at Storm Peak Laboratory, Colorado. *Bulletin of the American Meteorological Society*, *92*(7), 909-918. doi:10.1175/2011BAMS3026.1

Hew, K.F., & Brush, T. (2006). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research Development, 55*(1), 223-252.

Hutchison, A., Beschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *Reading Teacher*, *66*(1), 15-23. doi:10.1002/TRTR.0109

International Society for Technology in Education. (2003). *National educational technology standards for teachers: Resources for assessment.* Eugene, OR: International Society for Technology in Education (ISTE).

International Society for Technology in Education. (2013a). *Standards for students.* Retrieved from https://www.iste.org/standards/standards-for-students.

International Society for Technology in Education. (2013b). *Standards for teachers.* Retrieved from https://www.iste.org/standards/standards-for-teachers.

Jennings, N., Swidler, S., & Koliba, C. (2005). Place-based education in the reform era – conflict or compliment? *American Journal of Education, 112*(1), 44-65.

Kemp, A. T. (2006). Engaging the environment. *Curriculum & Teaching Dialogue*, *8*(1/2), 125-

142.

Kopcha, T.J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, *59*(4), 1109-1121.

Lai, C.-H., Yang, J.-C., Chen, F.-C., Ho, C.-W., & Chan, T.-W. (2007). Affordances of mobile technologies for experiential learning: The interplay of technology and pedagogical practices. *Journal of Computer Assisted Learning*, *23*(1), 326-337.

Lee, Y.-J. (2011). Empowering teachers to create educational software: A constructivist approach utilizing etoys, pair programming and cognitive apprenticeship. *Computers & Education*, *56*(2), 527-538.

Merriam, S.B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass.

North Routt Community Charter School. (2013). *About NRCCS.* Retrieved from http://northroutt.com/.

Northrop, L., & Killeen, E. (2013). A framework for using iPads to build early literacy skills. *Reading Teacher*, *66*(7), 531-537. doi:10.1002/TRTR.1155

Oigara, J. N., & Wallace, N. (2012). Modeling, training, and mentoring teacher candidates to use SMART Board technology. *Issues in Informing Science & Information Technology*, *9*297-315.

Oliver, A., Osa, J.O., & Walker, T.M. (2012). Using instructional technologies to enhance teaching and learning for the 21st century PreK-12 students: The case of a professional education programs unit. *International Journal of Instructional Media*, *39*(4), 283-295).

Pathway Innovations and Technologies, Inc. (2014). *HoverCam*. Retrieved from http://www.thehovercam.com/store/hovercam-document-cameras/hovercam-solo-5-detail

Pedrosa de Jesus, H., Almeida, P, Teixeira-Dias, J.J., & Watts, M. (2007). Where learners' questions meet modes of teaching : A study of cases. *Research in Education, 78*(1), 1-20.

Perkins, N., Hazelton, E., Erickson, J., & Allan, W. (2010). Place-based education and geographic information systems: Enhancing the spatial awareness of middle school students in Maine. *Journal of Geography, 109*(4), 213-218.

Plesch, C., Kaendler, N.R., Rummel, N., Wiedmann, M., & Spada, H. (2013). Identifying areas of tension in the field of technology-enhanced learning: Results of an international Delphi study. *Computers & Education*, *65*(1), 92-105.

Ritzhaupt, A. D., Dawson, K., & Cavanaugh, C. (2012). An investigation of factors influencing student use of technology in K-12 classrooms using path analysis. *Journal of Educational Computing Research*, *46*(3), 229-254.

Smith, G. A. (2007). Place-based education: Breaking through the constraining regularities of public school. *Environmental Education Research*, *13*(2), 189-207. doi:10.1080/13504620701285180

Stake, R. E. (2010). *Qualitative research: Studying how things work*. New York: Guilford Press.

StoryBird. (2014). *StoryBird.* Retrieved from http://storybird.com/

StoryJumper, Inc. (2014). *StoryJumper.* Retrieved from http://www.storyjumper.com/

Teo, T. (2012). Factors influencing teachers' intention to use technology: Model development and test**.** *Computers & Education*, *57*(4), 2432-2440.

U.S. Green Building Council. (2013). *LEED Standards.* Retrieved from http://www.usgbc.org/.

Wake, D. (2012). Exploring rural contexts with digital storytelling. *Rural Educator*, *33*(3), 23-37.

Warburton, S. (2009). Second life in higher education: Assessing the potential for and the barriers to deploying virtual worlds in learning and teaching. *British Journal of Educational Technology*, *40*(3), 414-426.

Warschauer, M., Grant, D., Del Real, G., & Rousseau, M. (2004). Promoting academic literacy with technology: Successful laptop programs in K-12 schools. *System: An International Journal of Educational Technology and Applied Linguistics*, *32*(4), 525-537.

World Media Group, LLC. (2013). *Clark, CO, Weather*. Retrieved from http://www.usa.com/clark-co-weather.html

Appendix A

International Society for Technology in Education (ISTE) Standards•S (Students)*

1. Creativity and Innovation

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

a. Apply existing knowledge to generate new ideas, products, or processes.
b. Create original works as a means of personal or group expression.
c. Use models and simulations to explore complex systems and issues.
d. Identify trends and forecast possibilities.

2. Communication and Collaboration

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
c. Develop cultural understanding and global awareness by engaging with learners of other cultures.
d. Contribute to project teams to produce original works or solve problems.

3. Research and Information Fluency

Students apply digital tools to gather, evaluate, and use information.

a. Plan strategies to guide inquiry.
b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
d. Process data and report results.

4. Critical Thinking, Problem Solving, and Decision Making

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

a. Identify and define authentic problems and significant questions for investigation.
b. Plan and manage activities to develop a solution or complete a project.
c. Collect and analyze data to identify solutions and/or make informed decisions.
d. Use multiple processes and divers perspectives to explore alternative solutions.

5. Digital Citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior**.**

a. Advocate and practice safe, legal, and responsible use of information and technology.
b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
c. Demonstrate personal responsibility for lifelong learning.
d. Exhibit leadership for digital citizenship.

6. Technology Operations and Concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations.

a. Understand and use technology systems.
b. Select and use applications effectively and productively.
c. Troubleshoot systems and applications.
d. Transfer current knowledge to learning of new technologies.

Appendix B

International Society for Technology in Education (ISTE) Standards•T (Teachers)*

1. Facilitate and Inspire Student Learning and Creativity

Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

a. Promote, support, and model creative and innovative thinking and inventiveness
b. Engage students in exploring real-world issues and solving authentic problems using digital tools and resources
c. Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes
d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments

2. Design and Develop Digital Age Learning Experiences and Assessments

Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS-S.

a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
c. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

3. Model Digital Age Work and Learning

Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.

a. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations
b. collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation
c. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats

d. Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning

4. Promote and Model Digital Citizenship and Responsibility

Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.

a. Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources
b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources
c. Promote and model digital etiquette and responsible social interactions related to the use of technology and information
d. Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools

5. Engage in Professional Growth and Leadership

Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.

a. Participate in local and global learning communities to explore creative applications of technology to improve student learning
b. Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others
c. Evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning
d. Contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community

Appendix C

Expeditionary Learning Design Principles*

1. The Primacy of Self-Discovery
Learning happens best with emotion, challenge, and the requisite support. People discover their abilities, values, passions, and responsibilities in situations that offer adventure and the unexpected. In Expeditionary Learning schools, students undertake tasks that require perseverance, fitness, craftsmanship, imagination, self-discipline, and significant achievement. A teacher's primary task is to help students overcome their fears and discover they can do more than they think they can.

2. The Having of Wonderful Ideas
Teaching in Expeditionary Learning schools fosters curiosity about the world by creating learning situations that provide something important to think about, time to experiment, and time to make sense of what is observed.

3. The Responsibility for Learning
Learning is both a personal process of discovery and a social activity. Everyone learns both individually and as part of a group. Every aspect of an Expeditionary Learning school encourages both children and adults to become increasingly responsible for directing their own personal and collective learning.

4. Empathy and Caring
Learning is fostered best in communities where students' and teachers' ideas are respected and where there is mutual trust. Learning groups are small in Expeditionary Learning schools, with a caring adult looking after the progress and acting as an advocate for each child. Older students mentor younger ones, and students feel physically and emotionally safe.

5. Success and Failure
All students need to be successful if they are to build the confidence and capacity to take risks and meet increasingly difficult challenges. But it is also important for students to learn from their failures, to persevere when things are hard, and to learn to turn disabilities into opportunities.

6. Collaboration and Competition
Individual development and group development are integrated so that the value of friendship, trust, and group action is clear. Students are encouraged to compete, not against each other, but with their own personal best and with rigorous standards of excellence.

7. Diversity and Inclusion

Both diversity and inclusion increase the richness of ideas, creative power, problem-solving ability, and respect for others. In Expeditionary Learning schools, students investigate and value their different histories and talents as well as those of other communities and cultures. Schools and learning groups are heterogeneous.

8. The Natural World
A direct and respectful relationship with the natural world refreshes the human spirit and teaches the important ideas of recurring cycles and cause and effect. Students learn to become stewards of the earth and of future generations.

9. Solitude and Reflection
Students and teachers need time alone to explore their own thoughts, make their own connections, and create their own ideas. They also need to exchange their reflections with other students and with adults.

10. Service and Compassion
We are crew, not passengers. Students and teachers are strengthened by acts of consequential service to others, and one of an Expeditionary Learning school's primary functions is to prepare students with the attitudes and skills to learn from and be of service.

*Researcher reproduced the Expeditionary Learning 10 Design Principles for personal and educational use per the Copyright Act of 1976 Section 107 Limitations of Exclusive Rights: Fair Use.

Appendix D

Staff Member Demographics

Position	Sex	Age	Education	Years in Education
Director	M	34	MA	10+
Kindergarten	F	33	MA	10+
Kindergarten Paraprofessional	F	60	BA	12+
1st and 2nd grade	F	38	BA	10+
3rd and 4th grade	F	48	BA	25+
5th and 6th grade	F	30	MA	3+
7th and 8th grade	M	52	BS	4+
Coach	F	48	BS	14+
Para pro #1	F	36	No degree	5+
Para pro #2	F	53	No degree	10+

Appendix E

North Routt Community Charter School

Appendix F

Interview Guide Questions

1. Grade level
2. Number of years teaching
3. Did your college education include learning activities on technology use? If yes, please describe.
4. Have you taken any workshops or professional development provided on how to use technology for teaching? If yes, please describe.
5. Why and when did you first begin using technology?
6. Do you find it easy or difficult to use new technologies? Can you give me a brief example of a new technology you recently adopted?
7. How often do you use computer technology with your teaching?
8. How well do you feel technology use fits in with the way you teach?
9. Is this your first teaching experience in the place-based, Expeditionary Learning Outward Bound approach to curriculum? If yes, how do you feel it differs from more "traditional" approaches to curriculum.
10. Do you feel there are differences in how you integrate technology into the current curriculum vs. past curriculum experiences? Please explain.
11. Do you intentionally design assignments, activities, and assessments with technology in mind? If yes, please give examples.
12. Do you find certain subjects more amenable to technology integration? If so, what subjects and why?
13. Do you use technology in your daily life outside the classroom?
14. Do you have favorite technologies? If so, please explain.

15. Have you heard of Web 2.0? If so, define

Appendix G

Follow-Up Interview Form

Grade Level

Follow-up questions to Interview Guide Questions:

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.

Appendix H

International Society for Technology in Education (ISTE)

Snapshot Assessment Instrument*

Observer Name_____ Observer Role_____

Date_____ Purpose of Observation_____

Check all that apply or provide a count where noted.

General Topics							
Access	Number of Computers						
	Number with Internet Access						
	Number of computers in use						
	Number of computers used by students						
Students are:	Working in a context or topic of obvious interest						
	Actively engaged in learning						
Standards and Curriculum	The standard being addressed is apparent						
Teacher is:	Directing whole group - one way interaction						
	Interacting with whole group – two way interaction						

	Facilitating/coaching individuals or groups						
	Managing behavior or materials						
	Facilitating effective technology use						
Specialized Topics							
Professional Development	There is evidence of professional development in action						
Standards and Curriculum	Activities connect technology with curriculum standards						
	Activities are aligned with standards						

* Researcher reproduced the ISTE Snapshot Assessment Instrument for personal and educational use per the Copyright Act of 1976 Section 107 Limitations of Exclusive Rights: Fair Use.

Appendix I

Informed Consent

COLLEGE OF EDUCATION

DEPARTMENT OF LEADERSHIP, TECHNOLOGY, and HUMAN DEVELOPMENT

INFORMED CONSENT

I am Tammy Stratton, an Ed.S. Candidate in Instructional Technology (100% online) at Georgia Southern University. I plan to graduate in spring 2014, and will conduct the research case study to fulfill my final program requirements.

The purpose of this research is to, first, determine how your specific charter school integrates 21st Century technology in support of 21st Century skills as identified by the International Society for Technology in Education (ISTE) Standards•T, while determining how the integration enhances or challenges the charter school's place-based, Expeditionary Learning Outward Bound (ELOB) approach to curriculum. The study aims to either confirm the charter school's current best practices with technology integration or inform the charter school of the possibility and potentiality of 21st Century technology integration (e.g., software, mobile learning devices, pod casts, virtual learning environments, Web 2.0) within their unique curriculum.

Participation in this research will include completion of a mix of in-person semi-structured and unstructured/informal interviews, classroom observations, and supplying prior, current, and/or future projects, lessons, and activities for analysis.

Risk is no greater than risk associated with daily life experiences, but you may experience some discomfort or embarrassment with certain questions regarding your practices and beliefs. You do not have to answer or reveal any information you are uncomfortable revealing and may withdraw from interviews, observations, document analysis, or the case study at any time.

The benefits to you may include new and/or additional knowledge regarding 21st Century tools (websites, Web 2.0, podcasts, etc.), practices, and technology integration utilized to enhance your teachings and unique curriculum.

The benefits to society include potential new and/or additional knowledge of 21st Century technology integration as it relates to rural schools in general and, specifically, the schools that utilize the place-based approach to curriculum supported through the Expeditionary Learning Outward Bound model.

Interviews, observations, and document analysis schedule will be determined with your input. Interviews may range from informal/short (5 minutes) to semi-formal/extended (15 minutes) two to four times a week depending on your schedule. Observation times will also depend on specific class and/or lesson, with a potential of one daily observation two to four times a week. Document analysis will commence according to your availability to explain the project, lesson, or activity.

The researcher holds 100% access and responsibility for your information that will be maintained on the researcher's USB flash drive and laptop computer, with notes and hard copy files maintained in a locked filing cabinet within the researcher's home. The data will be maintained in the secure location for a minimum of 3 years following completion of the study. The Faculty Advisor and requisite professors will have access to the completed written research study and data as required for program completion.

You have the right to ask questions and have those questions answered. If you have questions about this study, please contact the researcher named above or the researcher's faculty advisor, whose contact information is located at the end of the informed consent. For questions concerning your rights as a research participant, contact Georgia Southern University Office of Research Services and Sponsored Programs at (912) 478-0843.

There is no monetary compensation and you do not have to participate in this research and may end participation at any time by alerting the researcher in person, by phone (970) 367-6729, or email: ts02158@georgiasouthern.edu. You do not have to answer any questions you do not want to answer.

There is no penalty for deciding not to participate in the study; you may decide at any time not to participate and may withdraw without penalty or retribution.

You must be 18 years of age or older to consent to participate in this research study. If you consent to participate in this research study and to the terms above, please sign your name and indicate the date below:

You will be given a copy of this consent form to keep for your records. This project has been reviewed and approved by the GSU Institutional Review Board under tracking number **H14300**.

Title of Project: A Case Study of the Integration of 21st Century Technology within the Place-Based, Expeditionary Learning Outward Bound (ELOB) Approach to Education

Principal Investigator: Tammy M. Stratton
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_____ _____

Participant Signature Date

I, the undersigned, verify that the above informed consent procedure has been followed.

_____ _____

Investigator Signature Date